# Testbeds Help Connect Research to NWS Forecast Operations

- **Testbeds can help, particularly with**
  - Creating partnerships at the forecaster/researcher level
  - incremental improvements in existing forecast tools and
  - field testing high-risk/high-reward options

- **Testbeds have taken different forms depending on the forecast problem and state of the science/technology, e.g.,**
  - Hurricane prediction is very centralized, while severe weather warnings are local
  - QPE depends on advancing observing systems, while HWRF is a key for hurricanes

# Testbeds Partly Supported by NOAA-USWRP and W&W/ST&I

| Testbed | Leading OAR Lab | Partner Labs | Leading NWS recipient | Key applications |
|---|---|---|---|---|
| **Joint Hurricane Testbed (JHT)** | AOML/Hurricane Research Div. | PSD<br>GSD | National Hurricane Center | Track<br>Intensity |
| **Hydrometeorological Testbed (HMT)** | ESRL/Physical Sciences Div. | GSD<br>NSSL | OHD, RFCs, NCEP/HPC | QPF, QPE<br>Snow level<br>Flooding |
| **Developmental Testbed Center (DTC)** | ESRL/Global Systems Div. | NCAR | NCEP/Environmental Modeling Center | Mesoscale modeling |

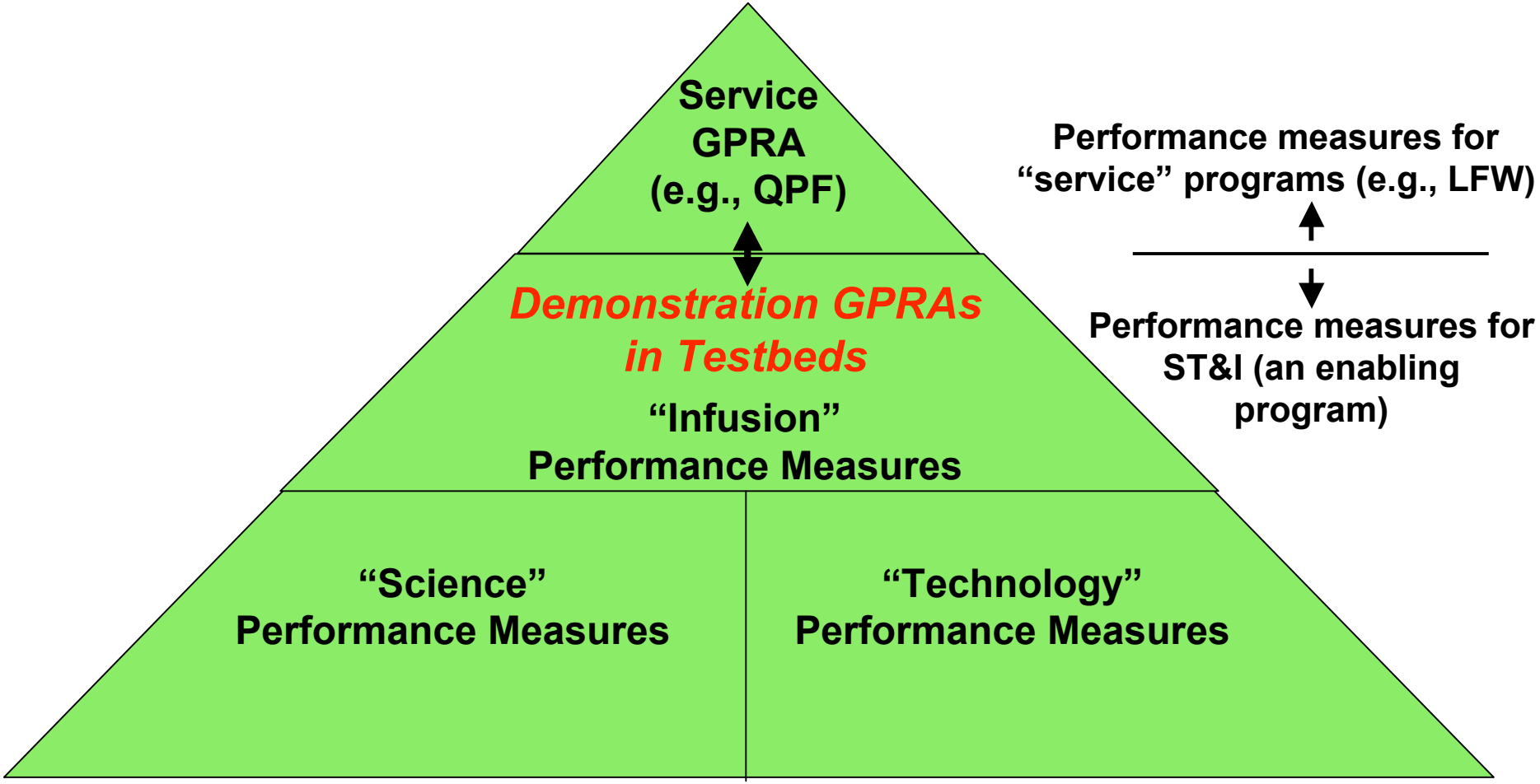
Note that the **Joint Center for Satellite Data Assimilation (JCSDA)** and **THORPEX** both developed partly from USWRP-sponsored seed efforts and are now running independently.

# Related Capabilities Partly Supported by NOAA-USWRP

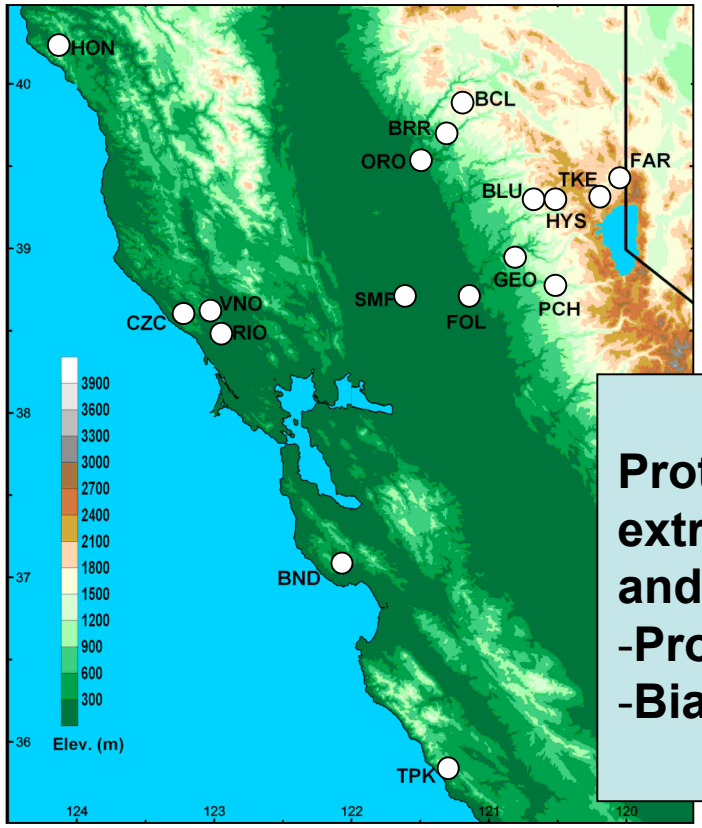
| Capability | Leading Organization | Key Partners | Description |
|---|---|---|---|
| **Societal Impacts Program (SIP)** | NCAR | NSF | Studies use and value of weather predictions |
| **CSTAR** | NOAA/NWS | WFOs | Grants to Universities to work with WFOs |

# Linking Science, Technology & Infusion Performance Measures to NOAA GPRA Measures

**Today's predictive services exist on a foundation of earlier innovation in science and technology**

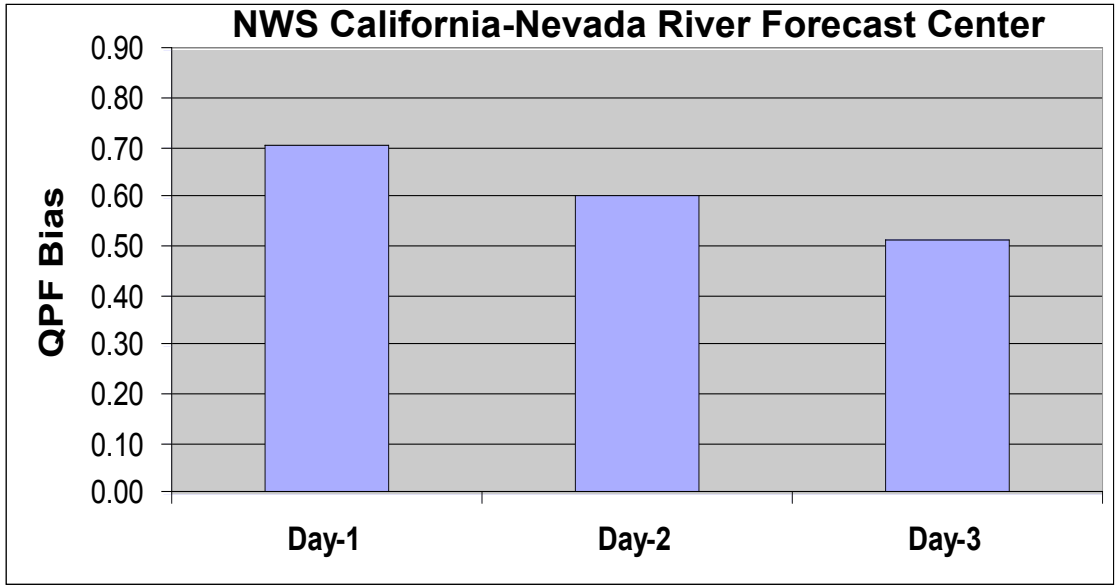


# On Developing a Performance Measure for Forecasting Extreme Precipitation




- HMT has worked with forecast users to identify critical needs for extreme event prediction.

**Prototype QPF performance measures for extreme precipitation events are being developed and baselines are being created by HMT**
**-Probability of Detecting (Forecasting) a >3 inch event**
**-Bias of QPF in events with >3 inches rain observed**




- Of 62 events with >5 inches in 24 hours, the QPF bias was low
  - -0.71 (1-day lead)
  - -0.61 (2-day lead)
  - -0.51 (3-day lead)

- Of 16 events with >5 inches of rain in 24 h, 2 were predicted 1 day ahead

## Tuesday, April 28

9:15 **Overview of Testbeds**

The Developmental Testbed Center: Past, Present & the Future – *Steve Koch (ESRL)*
Societal Impacts Program – *Rebecca Morss (NCAR)*
An Overview of the Hydrometeorology Testbed – *Tim Schneider (ESRL)*
Overview of the CSTAR Program – *Sam Contorno (NOAA)*
Joint Hurricane Testbed – *Jiann-Gwo Jiing (NWS)*

12:45 **Testbed Roundup 1 – Hydrometeorology Testbed & CSTAR**

ALPS Workstation Development for HMT and Other Workstation Testbed Activities in GSD – *Woody Roberts (ESRL)*

A Wind Profiler and GPS-Based Water Vapor Flux Tool for Precipitation Forecasting in Coastal Mountains – *Paul Neiman (ESRL)*

Evaluation and Comparison of Microphysical Algorithms in WRF-ARW Model Simulations of Atmospheric River Events Affecting the California Coast – *Isidora Jankov (ESRL)*

CSTAR Activities at the University of Utah: Estimating Optimal Distributions of Surface Observing Stations for Existing Networks & Testbeds – *John Horel (University of Utah)*

High-Resolution Global Precipitation Analyses Based on Multiple Satellite Observations and In Situ Measurements – *Pingping Xie (NCEP)*

2:15 **Testbed Roundup 1 – HMT & CSTAR *(cont.)***

Developing a Performance Measure for Snow-Level Forecasts – *Allen White (ESRL)*

Status and Plans for the Hydrometeorological Testbed at the Hydrometeorological Prediction Center – *Edwin Danaher (NWS)*

A Review of Recent U Albany CSTAR Research on Warm-Season Precipitation Systems Including Predecessor Rain Events Ahead of Tropical Cyclones – *Tom Galarneau (SUNY)*

3:00 **Testbed Roundup 2 – Developmental Testbed Center**

Verification at the DTC – *Tressa Fowler (NCAR)*
Hurricane WRF at the DTC – *Shaowu Bao (ESRL)*
The HFIP High-Resolution Hurricane Test – *Ligia Bernardet (ESRL)*

3:45 **Testbed Collaborations** – Joint Efforts between the DTC and the HMT – *Barb Brown (NCAR)*

## Wednesday, April 29

8:30 **Connections to other NOAA Programs, Projects & Activities that Involve R2O**

Research to Operations in the Joint Center for Satellite Data Assimilation – *Steve Goodman (NOAA/NASA)*

THORPEX – *John Gaynor (NOAA)*

SPoRT – An End-to-End R2O Activity – *Gary Jedlovec (NASA)*

The Hazardous Weather Testbed – *Jack Kain (NSSL)*

The GOES-R Proving Ground – *Steve Goodman (NOAA/NASA)*

10:30 **Testbed Roundup 3 – Joint Hurricane Testbed**

Evaluation and Improvement of Ocean Model Performance for Coupled Hurricane Forecast Models – *George Halliwell (NOAA)*

URI contribution towards improving the GFDL and HWRF operational hurricane models under JHT funding and future plans – *Richard Yablonsky (University of Rhode Island)*

Impact of Sea Spray on the Balance of Turbulent Kinetic Energy in the Hurricane Surface Boundary Layer – *Jian-Wen Bao (ESRL)*

Pacific Ocean Tropical Synoptic Regimes and their Effect and Importance on the Globe - *Bill Ward (NWS)*

12:45 **Testbed Roundup 4 – Societal Impacts Program**

The U.S. public's perceptions of weather forecasts and forecast uncertainty: Results from a survey – *Rebecca Morss (NCAR)*

Socio-Economic Research on Hurricane Forecasts and Warnings: A Discussion of Results and Research Plans – *Jeff Lazo (NCAR)*

1:15 **Group Discussion** – moderator, *John Gaynor*

2:15 **Testbed Breakout Sessions**

3:30 **Team Report-outs, Group Discussion** & **Workshop Wrap-up** – *Marty Ralph*